

Weekly Report

2016.09.19-2016.09.25

1.This Week

Security Projects

- 1.revise the remaining and newly discovered bugs of the system.
- 2.write the create new node function of the system.
- 3.revise the contract and technical document.

TCP Tree Paper

- 1.write the air quality analysis section in related work
- 2.read the entire paper and revise improper parts

Zongzhuang's Paper

- 1.write the graph visualization part of his paper

Classes

- 1.take classes

Paper Reading

1. (Intensive Reading) Magnostics: Image-based Search of Interesting Matrix Views for Guided Network Exploration

2017 VIS

This paper aims at retrieving matrix view patterns to support the exploration of networks. It takes five patterns into concern (as shown in Figure 1) and identified a set of six useful feature descriptors out of 30 potential feature descriptors mentioned in other papers. They use a self-generated dataset to test the 30 feature descriptors and choose usable feature descriptors upon four quantifiable criteria: (1) pattern response, (2) pattern similarity, (3) pattern sensitivity and (4) pattern discrimination. Figure 2 shows the query-by-sketch interface used in specific application scenarios. The user can sketch in the canvas (1) an approximated matrix pattern and retrieve a ranked result list (2) according to a selected MAGNOSTICS feature descriptor (3).

The entire experiment design in this paper is complete and each stage has its own reasons and necessities. (I think that's the reason why this paper is selected by the committee.) The sketch canvas in the neat interface is another interesting part but may make it more difficult to use.

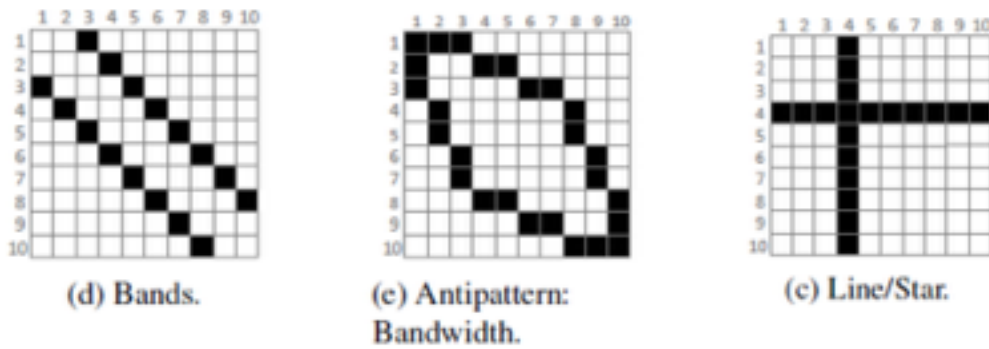


Figure 1. Five patterns in matrices.

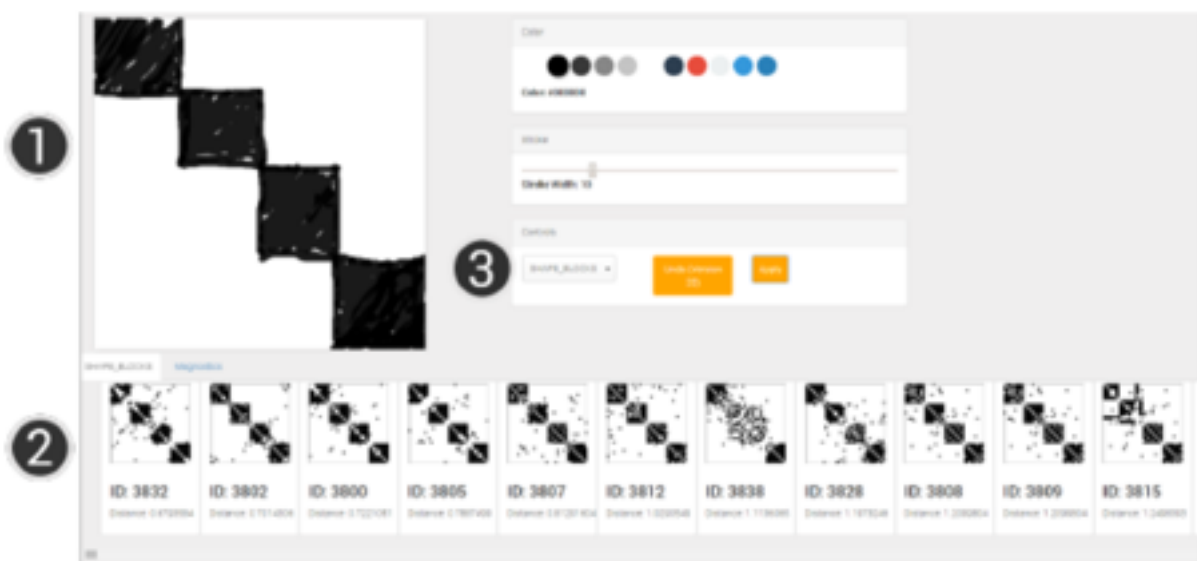


Figure 2. Query-By-Sketch interface for exploring large collections of matrix plots.

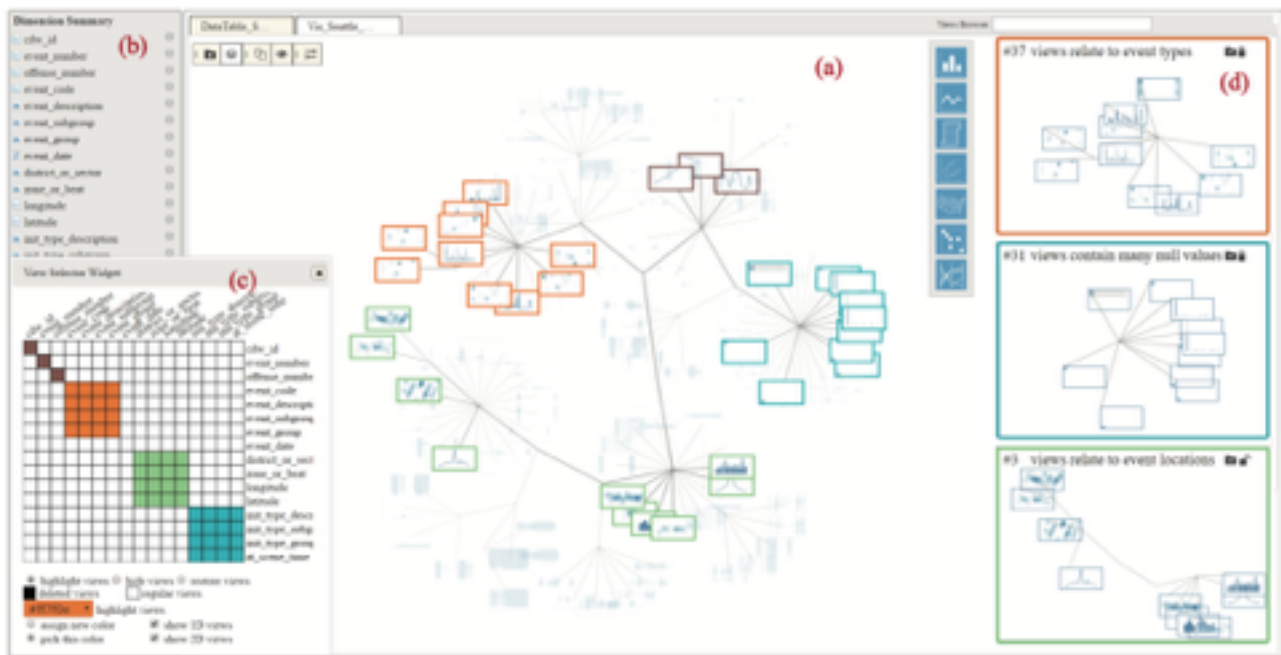
2.(Intensive Reading) DimScanner: A Relation-based Visual Exploration Approach Towards Data Dimension Inspection

2017 VIS 大师姐的论文

This paper proposes:

- (1) a view matching and structuring method that constructs view-wise relation structures of multi-dimensional data

Mutual information is used to decide whether two views are highly related because MI is able to evaluate the statistical correlation that may present a non-linear correlation; then, views are structured through a three-step-process: (a) pair views (b) generate quartets (c) construct view categorization tree based on an algorithm tailored for quartets structuring



(2) an exploration scheme that supports interactive investigation and view-wise relation validation of multi-dimensional data

The data view is switchable between the categorization tree layout and a flexible force-directed layout based on the given data configuration. Controls and assistance widgets are also available.

From the perspective of writing papers, this is a good paper because (1) the 2 selling points of this system are stressed as two sections and carefully described with no redundant part of system description (2) all possible confusions generated when reading this paper are well explained in the discussion part which contains four aspects to convince readers of the validity of this system as well as inform readers of the existing system limitations

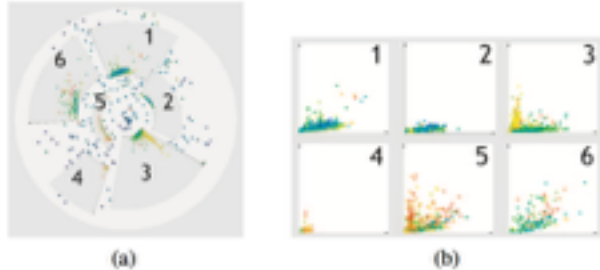
From the perspective of system design, this is a good system because (1) the idea to do dimension relationship inspection by matching views (both 2D and 1D views) is interesting and scientifically supported (2) the system interface is neat and clean, which only contains an appropriate amount of necessary widgets (3) the design of the controls and widgets are easy to use

However, personally I consider that putting both 1D and 2D views in the layout may be a little bit confusing for users and the paper doesn't explain the occurrence of a mixture of 1D and 2D views.

3.(Intensive Reading) Visual Analysis of the Air Pollution Problem in Hong Kong TVCG 2007

This paper presents a comprehensive system for multivariate weather data visualization, during which wind speed and direction are considered as a key factor in the generated vector field. Three visualization techniques are employed in this system:

(1) polar system enhanced by embedded pixel bar charts



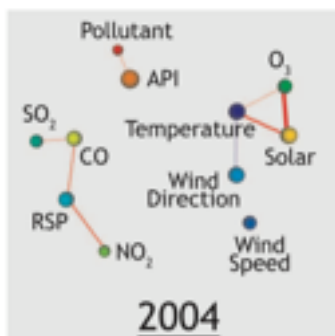
pixel bar charts (areas 1-6 shown in picture (a)) makes it possible to encode two more variables in a single chart and conventional pixel bars are also provided by the system to avoid decrease of analysis accuracy caused by plot shape distortion

(2) enhanced parallel coordinates with S-shape axis



Personally, I don't think the change of axis shape does any good to the improvement of parallel coordinate even take the importance of wind direction into consideration. It's not necessary.

(3) weighted complete graphs



Weighted complete graphs are used to get an overview of the correlations between multiple variates and therefore analysts can manually choose an axis order of the parallel coordinate view according to the correlation patterns between variables revealed by the weighted complete graph.

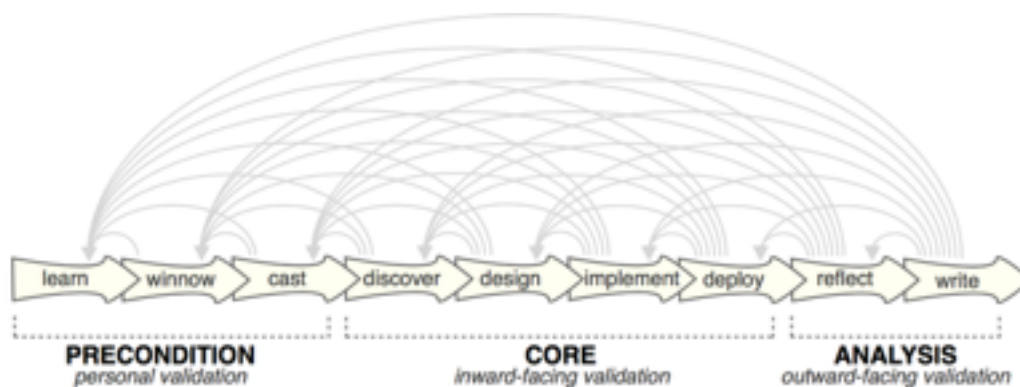
However, it could be better if this axis order choosing process could be automatically done by the computer itself. (It is not difficult to re-order the axis based on the results of the weighted complete graph.)

4.(Skimming Reading) Design Study Methodology: Reflections from the Trenches and the Stacks

TVCG 2012

This paper provide definitions of design study, propose a 9 stage framework and provide practical guidance for conducting design studies.

The 9-stage framework:



The nine stage are classified into three kinds: prediction, core and analysis. Each single stage in this framework are carefully described in this paper. This paper leads to a bright future of design study instruction.

2.To Do

- (1) Revise bugs of the Security Project.
- (2) Program the unfinished functions of the Security Project
- (3) Look for research topics of network security from the Security Project
- (4) Read Vis 2016 Papers before we participate Vis
- (5) Write Zongzhuang's Survey.
- (6) Do a little bit job with TCP Tree paper